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## (54) Soluble package

(57) A unitary package of soluble material is described for constituting a solution of known composition in which a predetermined quantity of a soluble composition is placed within a soluble container such that both the composition and the container when placed in a specified quantity of solvent dissolved to produce the solution of known composition.

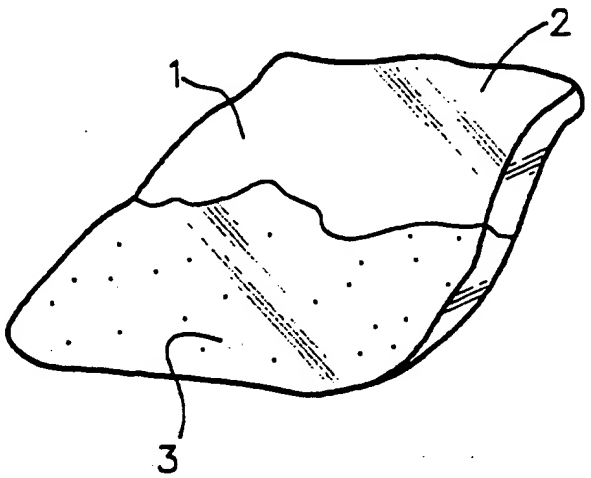


*Fig. 1*

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## Description

### BACKGROUND OF THE INVENTION

**[0001]** The present invention is directed to a preformed, sealed package containing a predetermined quantity of a composition for constitution into a solution of known concentration. More particularly, the present invention is directed to a soluble package or container which contains a predetermined quantity of a soluble composition such that the entire package can be reconstituted into a solution of known concentration by placing the package containing the composition into a suitable solvent such as water.

**[0002]** One of the more tedious and time consuming tasks found in laboratories and other locations where solutions of known concentration must be prepared is the actual preparation of the solution. Typically, this has evolved the measuring or weighing out of a specific quantity of a composition or mixture of compositions which are then dissolved in a specific quantity of solvent typically water. Besides the waste of time and inconvenience, these procedures inherently can lead to errors in the measuring out of the soluble material and/or the solvent as well as the hazard of material being spilled or coming into contact with the individuals involved in preparing the solutions.

**[0003]** It would, accordingly, be advantageous to provide a simple, fast way of preparing solutions of known concentration in which the tedious procedures of measuring out the soluble material and transferring it from a container to the solvent could be avoided. Such a system would also avoid much of the need for storing and maintaining large containers of soluble materials from which portions are removed for making up the required solutions.

### SUMMARY OF THE INVENTION

**[0004]** Accordingly, the present invention is directed to a package of soluble material that substantially obviates one or more of the problems, limitations and disadvantages of the prior art.

**[0005]** Additional features and advantages of the invention will be set forth in the description which follows and in part will be apparent from the description or may be learned by practice of the invention. The objectives and other advantages of the invention will be realized and attained by the system particularly pointed out in the written description and claims hereof as well as the appended drawings.

**[0006]** To achieve these and other advantages and in accordance with the purpose of the invention, as in embodied and broadly described the invention comprises a package of soluble materials for constituting a solution of known composition, wherein, a predetermined quantity of a soluble composition is disposed within a soluble container such that both the composition and the container when placed in a specified quantity of solvent, dissolves to produce the solution of known composition.

**[0007]** In some cases its is desirable to include within the soluble package two discrete materials which interact if in direct contact. So to avoid a premature interaction of the discrete materials, one such material is contained within an inner soluble package which is smaller than and fits inside an outer soluble package. The other such material is contained within the outer soluble package. When the package is placed in a specified quantity of solvent, the outer soluble package dissolves first releasing its material into the solvent. Seconds later, as the solvent reaches and dissolves the inner soluble package, its contents are released into the solvent but after a brief interval, so that the content of the inner package never comes into direct contact with the undissolved material of the outer package.

**[0008]** It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and intended to provide further explanation of the invention as claimed.

**[0009]** The accompanied drawings are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification illustrate one embodiment of the invention and together with the description serve to explain the principles of the invention.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0010]** Figure 1 is a perspective view of a sealed, soluble package containing a soluble, solid composition in accordance with the invention.

**[0011]** Figure 2 is a side view of a soluble capsule containing a soluble material in accordance with the present invention.

**[0012]** Figure 3 is a side view of a soluble capsule containing a soluble material in accordance with the present invention and an inner soluble capsule containing a discrete soluble material.

### DETAILED DESCRIPTION OF THE INVENTION

**[0013]** In accordance with the present invention, a unitary package of soluble material is provided for constituting a solution of known composition in which a predetermined quantity of one or more soluble components is disposed within a soluble sealed container such that both the composition and the container when placed in a quantity of suitable solvent dissolved to produce the solution of known composition.

**[0014]** Reference will now be made in detail to preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings.

**[0015]** As embodied herein and illustrated in Figure 1 of the drawings, a soluble bag-like package 1 is shown containing a soluble material 3 and sealed at one end 2 to provide a closed container. The quantity of the solu-

ble, material 7 is known having been weighed in advance. Typically, for example, a gram molecular weight of a particular compound might be included in a sealed water soluble package for placement in one liter of water in order to constitute a one mole solution. Clearly, multiples of this amount could also be packaged for constitution into either a greater volume of solution or a solution of greater or lesser concentration. Figure 2 of the drawings illustrates an alternative embodiment of the invention wherein the water soluble composition is placed in water soluble, two part capsule 4. The capsule consists of a body portion 5 having a cap 6 which slides over the body portion 5 to form a closed unitary container holding the water soluble composition 7.

**[0016]** The structure of the capsule in accordance with the invention is the same as found in ordinary gelatin capsules used for encapsulating medicinal materials. The particular soluble components placed in the capsule and the quantities of these components will be essentially the same as heretofore described with respect to package or envelope of Figure 1 of the drawings. While the particular water soluble package employed to enclose the predetermined quantity of soluble composition in accordance with the invention can be any suitable material which is soluble in the solvent being employed, typical materials for use in constituting aqueous solutions are polyvinyl alcohol for the envelope and gelatin for the capsule. Important considerations in selecting the material from which the package itself is to be constituted will be the solvent into which the package is to be placed as well as the compatibility of the dissolved package with the soluble composition. Clearly, when the soluble composition is dissolved, it should not undergo any chemical reaction or undesirable bonding with the dissolved package, particularly if this would have an affect upon the ultimate concentration or composition of the solution. It will also be important that the packaging material not react with the solid component placed within it.

**[0017]** Illustrated in Figure 3, is a soluble package or capsule 4, comprised of a bottom portion 5 and a cap portion 6. An inner capsule 8 is proportioned to fit within the outer capsule 4. The inner capsule 8 contains one discrete chemical substance 9 while the remaining volume of the capsule 4 contains a second discrete chemical substance 7. Thus the two substances, which would interact if in direct contact, do not come into direct contact until the soluble package is put into the solvent.

**[0018]** It will be apparent to those skilled in the art that various modifications and variations can be made in the system of the present invention without departing from the spirit or scope of the invention. Thus it is intended that the present invention cover the modifications in variations of this invention provided they come within the scope of the appended claims and their equivalent.

**Claims**

1. A unitary package of soluble materials for constituting a solution of known composition comprising:

   a predetermined quantity of a soluble composition disposed within a soluble container such that both said composition and container when placed in a specified quantity of solvent dissolve to produce the solution of known composition.

2. The unitary package of Claim 1 wherein said solvent is water.

3. The unitary package of Claim 1 wherein said package is a soluble envelope.

4. The unitary package of Claim 1 wherein both said composition and container are water soluble.

5. The unitary package of Claim 4 wherein said composition is a single water soluble compound.

6. The unitary package of Claim 5 wherein said compound is present in said container in an amount which is its gram molecular weight or a multiple thereof.

7. The unitary package of Claim 1 wherein said composition comprises a plurality of soluble components, each present in a predetermined proportion to the others.

8. The unitary package of Claim 3 wherein said soluble envelope is sealed.

9. The unitary package of Claim 1 wherein said container is a gelatin capsule.

10. The unitary package of Claim 3 wherein said envelope is made of polyvinyl alcohol.

11. A package of soluble materials for constituting a solution of known composition comprising:

    a predetermined quantity of a first soluble composition disposed within an outer soluble container

    a predetermined quantity of a second soluble composition disposed within an inner soluble container, proportioned to fit within said outer soluble container, such that both of said compositions and both of said compositions and both of said containers when placed in a specified quantity of solvent dissolve to produce the solution of known composition.

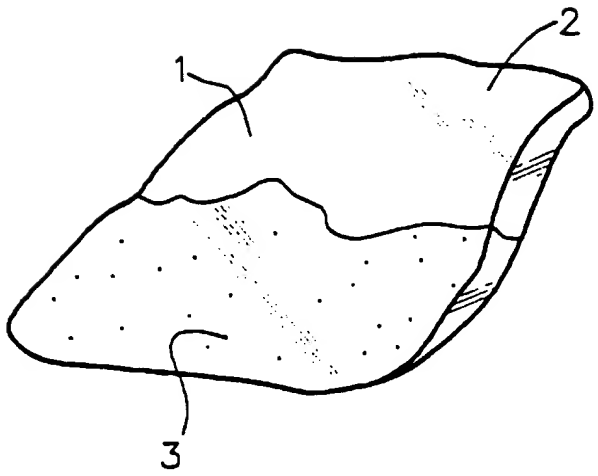


Fig. 1

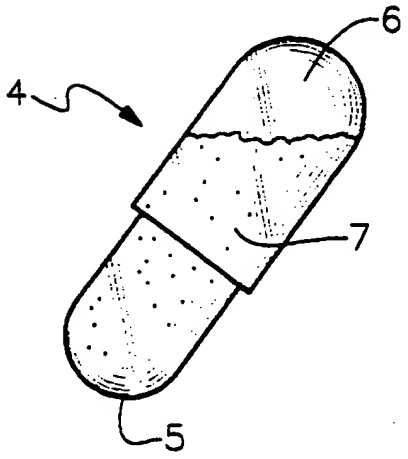


Fig. 2

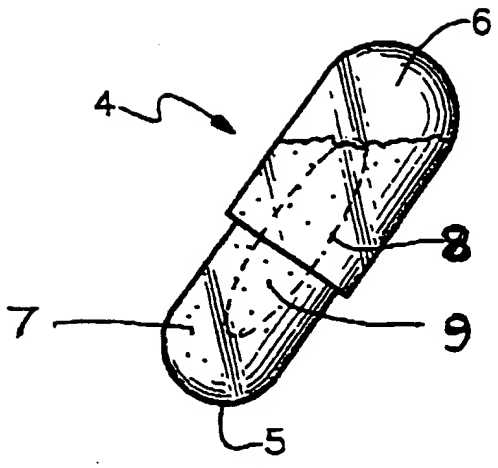


*Fig. 3*

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Application Number
EP 99 20 0677

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The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 17 June 1999 | Newell, P |

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